



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/814,530

03/31/2004

Russell Rapport

254-094-CIP4-C1

6898

7590

06/03/2005

J. Scott Denko  
Andrews Kurth, L.L.P.  
Suite 1700  
111 Congress Ave.  
Austin, TX 78701

EXAMINER

TRAN, THANH Y

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

JK

<b>Office Action Summary</b>	Application No. 10/814,530	Applicant(s) RAPPORT ET AL	
	Examiner Thanh Y. Tran	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 March 2005.  
 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 and 32 is/are pending in the application.  
     4a) Of the above claim(s) 13-31 is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-6 and 32 is/are rejected.  
 7) ☒ Claim(s) 7-12 is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.  
 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>01/07/05</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to because there is no figure showing the relations between upper flex contact 42 and lower flex contact 44 (first and second flex contacts) as recited in claims 2, 3, 4, 7, 9, 10, 11 and 12. There is no figure showing both elements 42 and 44 as described in the specification of the invention and as recited in the claims. Module contact “38” in figure 4 should be changed to “42” because “42” is described as an “upper flex contact” in the specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “on-contact vias” and “off-contact

Art Unit: 2822

vias” as recited in claims 11 and 12; “a set of the plurality of upper and lower flex contacts is connected to the first conductive layer” as recited in claim 7 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The disclosure is objected to because of the following informalities: the specification does not disclose “a set of said plurality of upper and lower flex contacts being connected to the first conductive layer” (emphasis added) as recited in claim 7. This limitation is not supported by the specification neither the drawings. The examiner does not see how *a set of the plurality of upper and lower flex contacts* is connected to the first conductive layer, since figure 4 only

shows the first conductive layer (54) is separate to a set of the plurality of upper and lower flex contacts (38, 44) by an intermediate layer (56), and it is not connected to a set of the plurality of upper and lower flex contacts as recited in claim 7.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 9, 11 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 9, it is also unclear to the Examiner if the functional language “express an n-bit datapath” and “express a 2n-bit module datapath” are functions inherent to the structure already recited (for example, what kind of CSP contact is used to express an n-bit datapath) or does this functional language imply additional structural limitation not explicitly stated in the claim. Applicant is required to clarify. For applying art the Examiner assumes that the functions of “express an n-bit datapath” and “express a 2n-bit module datapath” are inherent to the already cited structure.

Claim 11 is unclear as to what Applicant means by “on-contact vias”?

Claim 12 is unclear as to what Applicant means by “off-contact vias”?

*Claim Rejections - 35 USC § 102*

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1 and 3-6 are rejected under 35 U.S.C. 102(e) as being anticipated by Mukerji et al (U.S. 6,300,679).

As to claim 1, Mukerji discloses in figure 5 a high-density circuit module comprising: a first CSP (chip 501) having upper and lower major surfaces and a first and a second edge, the edges delineating a lateral extent for the upper major surface; a second CSP (chip 502); a form standard ("mask" 512) disposed between the first and second CSPs (chips 501, 502), the form standard ("mask" 512) having a lateral extent greater than the lateral extent of the upper major surface of the first CSP (chip 501), the form standard ("mask" 512) presenting at least one surface for contact with flex circuitry (comprising elements 510 and 511), the flex circuitry connecting the first and second CSPs (chips 501, 502) and disposed to place a first portion of the flex circuitry beneath the lower major surface of the first CSP (chip 501) and a second portion of the flex circuitry above the form standard ("mask" 512) disposed between the first and second CSPs (chips 501, 502).

As to claim 3, Mukerji discloses in figure 5 a high-density circuit module in which the flex circuitry (comprising elements 510 and 511) comprises a conductive layer (trace 511) that

Art Unit: 2822

expresses first and second flex contacts (first and second flex contacts are flex contacts 511 bonded to corresponding balls 530) for connection of the first and second CSPs (501, 502).

As to claim 4, Mukerji discloses in figure 5 a high-density circuit module comprising: flex circuitry (comprising elements 510 and 511) having at least one conductive layer (511), an outer layer (510), and first and second flex contacts (first and second flex contacts are flex contacts 511 bonded to corresponding balls 530); a first CSP (chip 501) having CSP contacts (530), the CSP contacts (530) of the first CSP (501) contacting the flex circuitry; a form standard (mask 512) presenting at least one surface for contact with the flex circuitry; a second CSP (502) having CSP contacts (chip 520), the first CSP (chip 501) being disposed above the form standard (mask 512) and the second CSP (chip 502), and the CSP contacts of the second CSP (chip 520) contacting the flex circuitry.

As to claim 5, Mukerji discloses in figure 5 a high-density circuit module in which the form standard (mask 512) presents at least one curved surface for contact with flex circuitry (510, 511).

As to claim 6, Mukerji discloses in figure 5 a high-density circuit module comprising: a first CSP (chip 501) having an upper and a lower major surface and a set of CSP contacts (530) along the lower major surface; a second CSP (chip 502) having first and second lateral edges and upper and lower major surfaces and a set of CSP contacts (520) along the lower major surface, the first and second lateral edges delineating an extent of the upper major surface of the second CSP (502) and the first CSP (501) being disposed above the second CSP (502); flex circuitry (comprising elements 510, 511) connecting the first and second CSPs (501, 502); and a form standard (mask 512) having an extent greater than the extent of the upper major surface of the

second CSP (502) and disposed so as to extend between the first and second CSPs (501, 502) and beyond the extent of the upper major surface of the second CSP (502).

*Claim Rejections - 35 USC § 103*

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mukerji et al (U.S. 6,300,679) in view of Nicewarner, Jr. et al (U.S. 5,776,797).

As to claim 2, Mukerji does not disclose a high-density circuit module in which the flex circuitry comprises at least one flex circuit having first and second conductive layers, between which there is an intermediate layer, the first and second conductive layers having demarked first and second flex contacts, the first flex contacts in electrical connection with the first CSP and the second flex contacts in electrical connection with the second CSP. Nicewarner discloses in figure 3 a high-density circuit module in which the flex circuitry (as indicated at 40, 42 and 12) comprises at least one flex circuit having first and second conductive layers (40, 42), between which there is an intermediate layer (as indicated at 12), the second conductive layer (42) having demarked first and second flex contacts (22, 28), the first flex contacts (22) in electrical connection with the first CSP (chip 18) and the second flex contacts (28) in electrical connection with the second CSP (chip 24). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Mukerji by

Art Unit: 2822

having a flex circuit which includes first and second conductive layers and an intermediate layer as taught by Nicewarner for allowing mechanical and electrical attachment between the integrated circuit assemblies (see col. 1, lines 55-65 in Nicewarner).

10. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mukerji et al (U.S. 6,300,679) in view of Casati et al (U.S. 5,763,296).

As to claim 32, Mukerji discloses in figure 5 a high-density circuit module comprising: a first CSP (chip 501) having upper and lower major surfaces and a first and a second edge, the edges delineating a lateral extent for the upper major surface, and having a plurality of CSP contacts (530) arranged along the lower major surface; a second CSP (chip 502); a form standard ("mask" 512) disposed between the first and second CSPs (501, 502) and outside of the first CSP (chip 501), the form standard ("mask" 512) having a lateral extent greater than the lateral extent of the upper major surface of the first CSP (chip 501), the form standard ("mask" 512) presenting at least one surface for contact with flex circuitry (comprising elements 510 and 511), the flex circuitry connecting the first and second CSPs (chips 501, 502) and disposed to place a first portion of the flex circuitry beneath the lower major surface of the first CSP (chip 501) and a second portion of the flex circuitry above the form standard ("mask" 512) disposed between the first and second CSPs (501, 502).

Mukerji et al does not disclose a first CSP having a plastic body. Casati et al discloses in figures 1-4 a chip having a plastic body (10) (see col. 3, lines 32-36). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the high-density circuit module of Mukerji et al by using a chip having a plastic body as

Art Unit: 2822

taught by Casati et al for providing improved reliability for the chip, and securing the chip which can be secured at an exact and stable location (see col. 3, line 64 – col. 4, line 6 in Casati et al).

***Allowable Subject Matter***

11. Claim 7 would be allowable if rewritten or amended to overcome the objections set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter: claim 7 recites, inter alia, “a high-density circuit module comprising: a first CSP; second CSP; a form standard, the first CSP is disposed above the form standard and the second CSP, the form standard presents an at least one curved surface for contact with a pair of flex circuits, the pair of flex circuits each has first and second conductive layers between which conductive layers there is an intermediate layer, the second conductive layer has demarked a plurality of upper and lower flex contacts, a set of the plurality of upper and lower flex contacts is connected to the first conductive layer”; and in the combination with other claimed limitations.

***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Komiyama (U.S. 6,329,708) discloses micro ball grid array semiconductor device and semiconductor module.

Pan (U.S. 6,588,095) discloses method of processing a device by electrophoresis coating.

***Response to Arguments***

13. Applicant's arguments filed 3/17/05 have been fully considered but they are not persuasive.

Applicant argued that Mukerji does not teach “a form standard disposed between the first and second CSPs”.

In response, the examiner disagrees with applicant’s argument because Mukerji clearly discloses in figure 5 a form standard (“mask” 512) disposed between the first and second CSPs (first and second chips 501, 502).

Applicant further argued that there is no teaching in Mukerji that indicates use of mask 512 as a form standard.

In response, the examiner disagrees with applicant’s argument because “a form standard” is known in the art, and it may be used as a base or holder or supporter for holding or supporting elements, for example, a flex circuitry. Applicant has never specifically recited “a form standard” is a conductive material form standard in the claims, and Mukerji clearly discloses in figure 5 a flex circuitry (comprising elements 510, 511) which is held or supported by a “mask” 512. Thus, the “mask” 512 is treated as “a form standard”.

Applicant further argued that Mukerji does not teach or suggest “a form standard disposed between the first and second CSPs” and “flex circuitry connecting the first and second CSPs and disposed to place a first portion of the flex circuitry beneath the lower major surface of the first CSP and a second portion of the flex circuitry above the form standard disposed between the first and second CSPs”.

In response, the examiner disagrees with applicant’s argument because Mukerji clearly discloses in figure 5 a form standard (“mask” 512) disposed between the first and second CSPs (first and second chips 501, 502) and flex circuitry (comprising elements 510, 511) connecting the first and second CSPs (first and second chips 501, 502) and disposed to place a first portion

Art Unit: 2822

of the flex circuitry (comprising elements 510, 511) beneath the lower major surface of the first CSP (first chip 501) and a second portion of the flex circuitry (comprising elements 510, 511) above the form standard ("mask" 512) disposed between the first and second CSPs (first and second chips 501, 502).

Applicant further argued that Nicewarner does not teach or suggest "a form standard disposed between the first and second CSPs".

In response, the examiner disagrees with applicant's argument because the above limitation was already disclosed in figure 5 of Mukerji, a form standard ("mask" 512) disposed between the first and second CSPs (first and second chips 501, 502).

#### ***Conclusion***

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Y. Tran whose telephone number is (571) 272-2110. The examiner can normally be reached on M-F (9-6:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TYT

  
AMIR ZARABIAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800